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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,434	12/10/2003	Jae-hyun Kim	Q77397	5183

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EXAMINER

TUNG, KEE M

ART UNIT PAPER NUMBER

2676

DATE MAILED: 04/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/731,434	Applicant(s) KIM ET AL.	
	Examiner Kee M Tung	Art Unit 2676	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>3/18/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Park et al (6,791,558 hereinafter "Park") in view of Hussain (6,801,203).

Park teaches a method and apparatus for processing pixel rasterization in a 3D rendering processor (Figs. 1 and 4) comprising pixel rasterization pipeline (12-15 and 17); a memory section (11) includes a texture cache section (21) and a pixel cache section (22) includes a Z-data section and a color data section; a flag memory section (16) and an external memory, such as frame memory for reading data into the pixel cache (22) and texture cache (21). However, Park fails to explicitly teach or suggest the pixel cache (22) includes two separate caches and the data read from external memory into the caches at the same time. This is what Hussain teaches (Figs. 2, 3). Hussain teaches an efficient graphics pipeline (such as, color pipeline 240, s/z pipeline 250 and texture pipeline 260 in **parallel**, see claim 1) with a pixel cache (three separate caches, a color cache 245, s/z cache 255 and texture cache 265) and data pre-fetching (Fig. 3 and abstract). It would have been obvious to one of ordinary skill in the art at the time the present invention was made to combine the teaching of Hussain into the system of Park in order to take the best advantage of the high bandwidth of the memory system

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while effectively masking the latency of the memory system and delivers high throughput as taught by Hussain (abstract and col. 11, lines 3-17). Therefore, at least claim 1 would have been obvious.

As per claim 2, Hussain teaches a color pixel buffer (pre-fetching FIFO 350 and col. 7, lines 10-25) that reads in advance the color data from the frame memory and stores the color data in the color data storage unit only when the result of z-test is determined to be a success in the pixel rasterization pipeline.

As per claim 3, Hussain teaches the color pixel buffer includes 4 or 8 entries (would have been obvious to one of ordinary skill in the art to modify the pre-fetching FIFO of Hussain as claimed because to change the size of the FIFO is considered within the level of ordinary skill in the art.

As per claim 4, Park teaches the result of z-test is determined to be successful when a pixel that is being rasterized is displayed on a screen, and determined to be not successful when the pixel is hidden on the screen (first and second Z-operation sections 12 and 14).

As per claim 5, Park teaches the z-data storage unit reads z-data required from the frame memory only when the z-data required is not stored in the z-data storage unit (cache miss).

Claims 6-10 are similar in scope to claims 1-5, and thus are rejected under similar rationale.

Claims 11-13 are similar in scope to claims 1, 4 and 5, and thus are rejected under similar rationale.

Claims 14-16 are similar in scope to claims 1,2, 4 and 5, and thus are rejected under similar rationale.

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kee M Tung whose telephone number is 571-272-7794. The examiner can normally be reached on Tuesday - Friday from 5:30 am - 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Kee M Tung
Primary Examiner
Art Unit 2676